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Ocean algae will cope well in varying climates, study shows

Tiny marine algae that play a critical role in supporting life on Earth may be better equipped to deal with future climate change than previously expected, research shows.

Scientists investigated the likely future impact of changing environmental conditions on ocean phytoplankton, a microscopic plant that forms the basis of all the oceans' food chains.

Phytoplankton is important for absorbing carbon dioxide from the atmosphere, while generating much of the oxygen needed to sustain life on Earth.

The study grew phytoplankton at the high carbon dioxide levels predicted for the year 2100 and beyond. The algae was allowed to evolve through 400 generations, with some exposed to varying levels of CO₂ and some kept at constant CO₂ levels.

Researchers found that phytoplankton exposed to fluctuating CO₂ levels was better able to cope with further changes in conditions, compared with algae grown in stable CO₂ levels. The finding suggests that populations of the algae will adapt more to the varied conditions expected in future than was previously thought based on experiments at stable conditions.

Scientists found however that the algae developed in changing CO₂ conditions evolved more and were smaller than those grown in stable conditions. These factors may impact on how well marine animals can feed off phytoplankton, and how efficiently the algae is able to take carbon out of the atmosphere and sink to the deep ocean. Plankton in some regions of the ocean may evolve more than others under global climate change, because some regions of ocean are currently more variable than others.

The studies, published in the *International Society for Microbial Ecology* journal and *Proceedings of the Royal Society B*, were supported by the Royal Society, the European Commission, and the Scottish Universities Life Sciences Alliance.

Dr Sinead Collins, of the University of Edinburgh's School of Biological Sciences, who led both studies, said: "Predicting how populations of ocean algae will respond to changing ocean conditions is difficult, but these results suggest that populations from highly changeable environments are better placed to deal with additional environmental change than previously suspected."

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